

PTO/PCT Rec'd 17 DEC 2001

BRIDGE JOINT

The present invention relates to a bridge joint, that is to say a joint between two sections of the roadway of a bridge.

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Bridge joints are required primarily because of thermal expansion and contraction in the roadway of a bridge. Also they accommodate initial contract on setting of concrete in the roadway and relative shear and rise/fall of adjacent roadway sections.

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The object of the present invention is to provide an improved bridge joint.

According to the present invention there is provided a bridge joint for joining two sections of a roadway of a bridge, the bridge joint comprising:

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- a plurality of roadway beams extending across the roadway and including:
  - opposite edge beams having support formations extending therealong, the edge beams being adapted to be fixed to respective opposite ones of the roadway sections and
  - intermediate beams;
- a plurality of crossbeams extending between the opposite edge beams,
  - the crossbeams having end formations which are complementary to the support formations of the edge beams,
  - the crossbeams being supported by engagement of the end formations with the support formations, whereby the crossbeams remain mutually parallel as the edge beams move with respect to each other, at least whilst the edge beams remain parallel and
  - the crossbeams and the intermediate beams being adapted for support of the intermediate beams on the crossbeams; and
- spacing features fixed on at least some of the crossbeams and co-operating with the intermediate beams for evenly spacing the latter between the edge beams

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characterised in that the support formations of the opposite edge beams are open, circular section grooves; and the end formations of the crossbeams are have spherical ends, sized to fit the grooves.

5 Normally the crossbeams will be of uniform length, whereby their angle with respect to the edge beams is determined by the separation of the edge beams and they are maintained parallel.

10 Preferably, the grooves of the support formations may be supplemented by support lips abutting the underside of the crossbeams, particularly where the edge beams are not expected to rise and fall with respect to each other.

15 Preferably, the spacing features are cams fixed to the crossbeams and acting on the intermediate beams. Whilst it is envisaged that the cams may be fixed to the top of the crossbeams; in the preferred embodiment, they are fixed to the bottom of the crossbeams. The intermediate beams have apertures through which the crossbeams extend, with the cams acting on bottom portions of the intermediate beams.

20 To help understanding of the invention, a specific embodiment thereof will now be described by way of example and with reference to the accompanying drawing, in which:

Figure 1 is a cross-sectional side view of a bridge joint of the invention; and Figure 2 is an underside view of the bridge joint of Figure 1.

25 The bridge joint 1 shown in the drawings is set between two adjacent bridge roadway sections 2,3, which are liable to move by a small amount with respect to each other. The joint has steel edge beams 4,5 arranged across the roadway at the edge of the concrete C of the roadway sections. Each edge beam has a central section 30 6, which is generally square in cross-section, a horizontal flange 7, which is cast into the concrete and a vertical flange 8, which edges the concrete. The central section has a circular cross-section groove 9, which opens towards the gap G between the roadway sections and the opposite edge beam.

Cross beams 10 are regularly spaced along the length of the joint, i.e. across the width of the roadway. They are of square section mild steel tube, with a stainless steel sheath 12 to improve their bearing qualities. To each end of the crossbeams, a spherical steel ball 14 is fixed, as by welding or pinning. The balls are sized to fit in the groove 9. Thus the angle  $\alpha$  which the crossbeams make with the edge beams is determined by the fixed length L of the crossbeams between the balls and the variable separation S of the edge beams. Whilst the edge beams remain parallel, the crossbeams will also remain parallel. To maintain the separation of the crossbeams, a number of spacer balls 15 is arranged in each groove 9 between each adjacent pair of crossbeam balls 14.

The crossbeams support a number, three as shown, of intermediate roadway beams 20. They are of general I-beam shape, with small grooves 21 in their heads 22. The edge flanges 8 of the edge beams also have such small grooves 21. Via these a diaphragm seal 23 is connected between each adjacent pair of roadway beams. These seals exclude water and dirt from the parts of the joint beneath them. The heads of the roadway beams provide the roadway surface between the concrete of the roadway sections 2,3. Feet 24 of the intermediate beams rest on the crossbeams. These transfer road loads to the edge beams via the balls 14 and lips 16 at the lower side of the mouth of the grooves 9.

To maintain the intermediate beams 20 evenly spaced, cams 17 are fixed to the underside of the crossbeams 10. They act against lower extensions 25 of the beams 20, the extensions being fitted to the beams after laying of them on the crossbeams. The joint is thus a coherent structure, which has a variable width. The cams are so shaped as to define a gap therebetween which is the same size as the thickness extensions 25, regardless of the angle  $\alpha$ .

The invention is not intended to be restricted to the details of the above described embodiment. For instance the number of intermediate beams can vary. Since the intermediate roadway beams are stiff, the cams need not be provided on each crossbeam. The cams can be provided above the crossbeams, acting against the

webs of the intermediate beams, if there is insufficient space for them to act against the beams' feet.

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